

Figure 1A

Identification of Functional Allele Families:

Motivation

◇ Repetitive Gene Systems

- Repetitive Biochemical Functions
- E.g. systems 1, 7

◇ Both systems must be inactivated before problems

- E.g. ((1A₂ or 1B₃) and (7A₃ or 7C₁))
- Automatic choice of allele combinations required

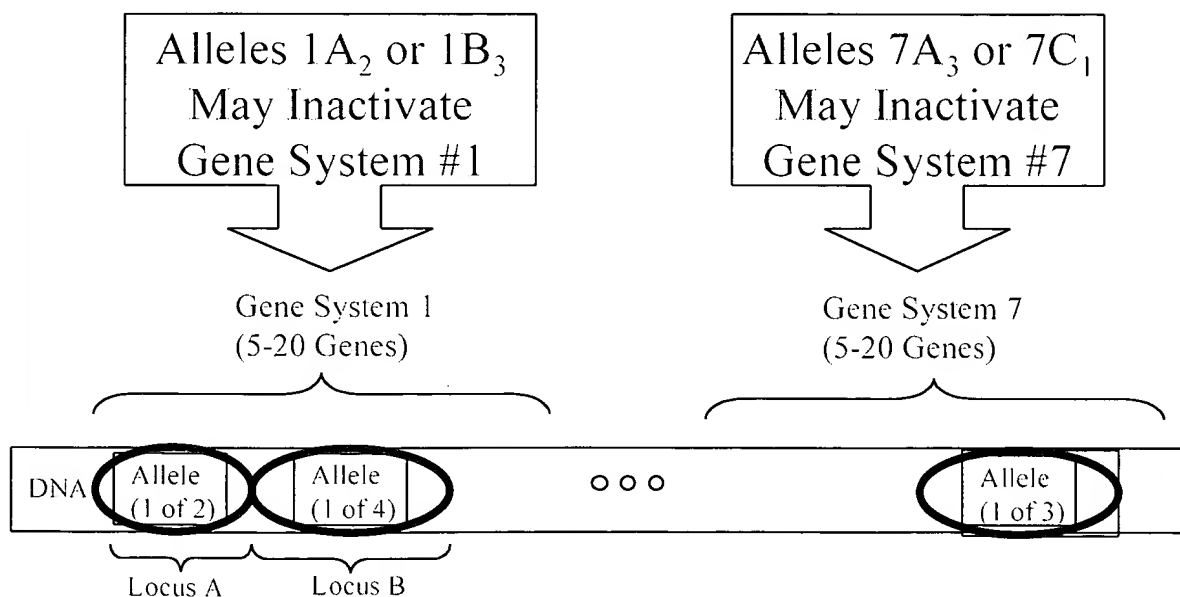
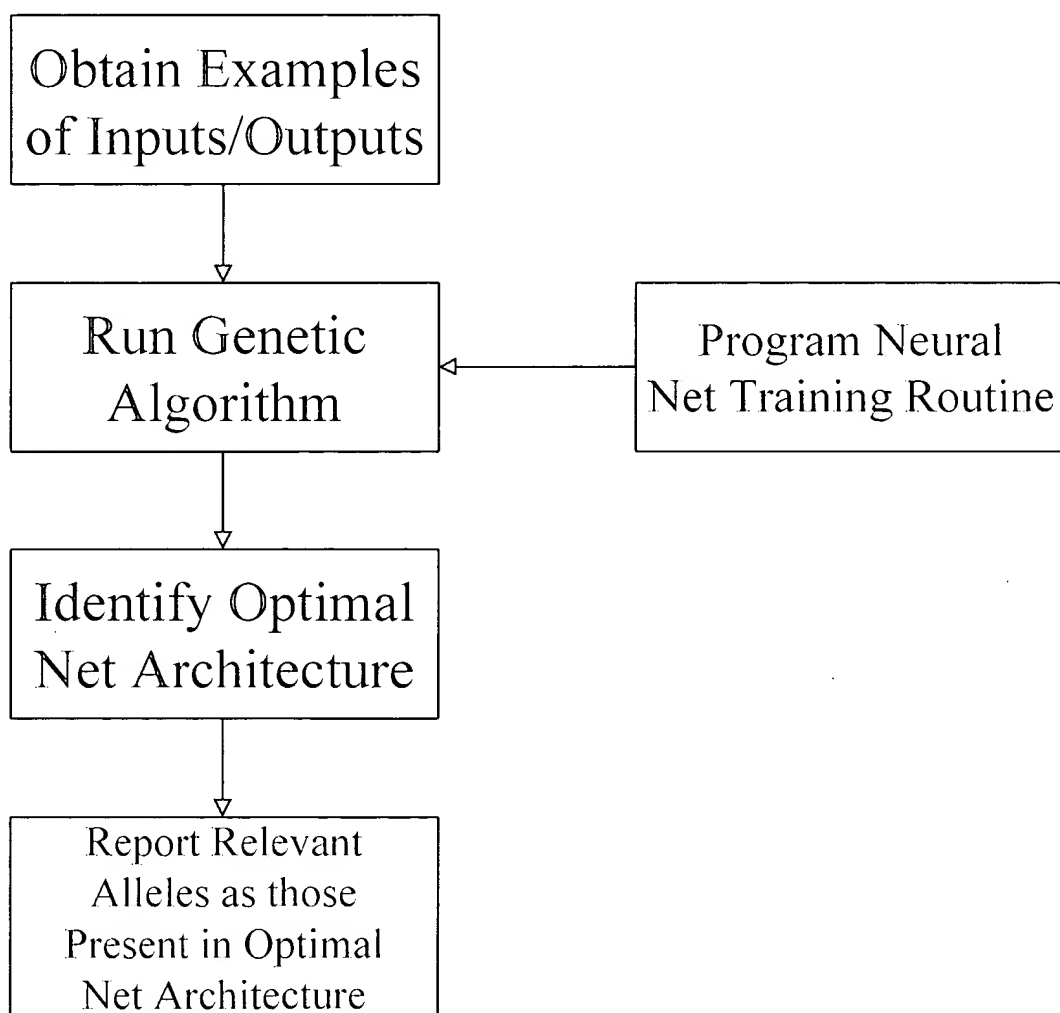


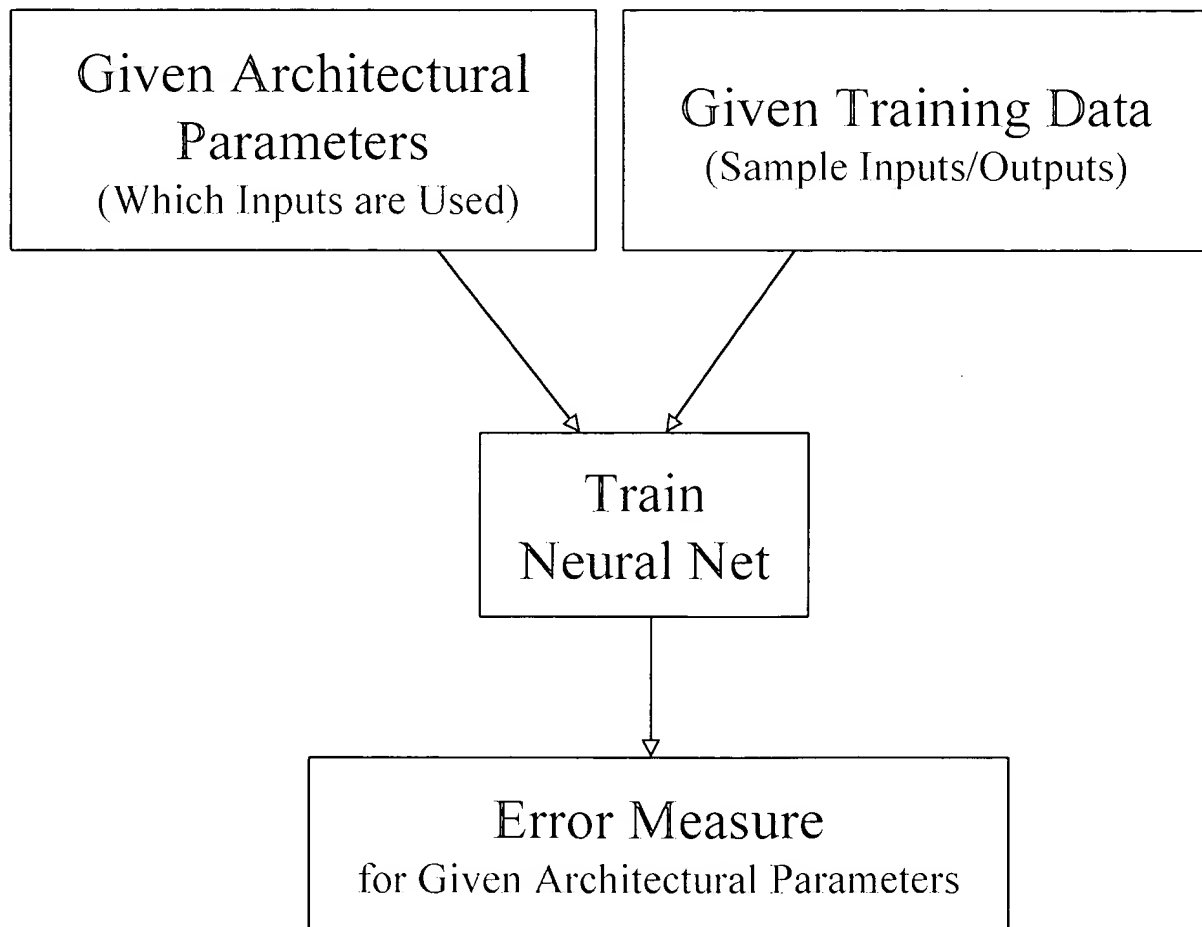
Figure 1B
Method of Identifying Clinically Relevant
Allele Combinations



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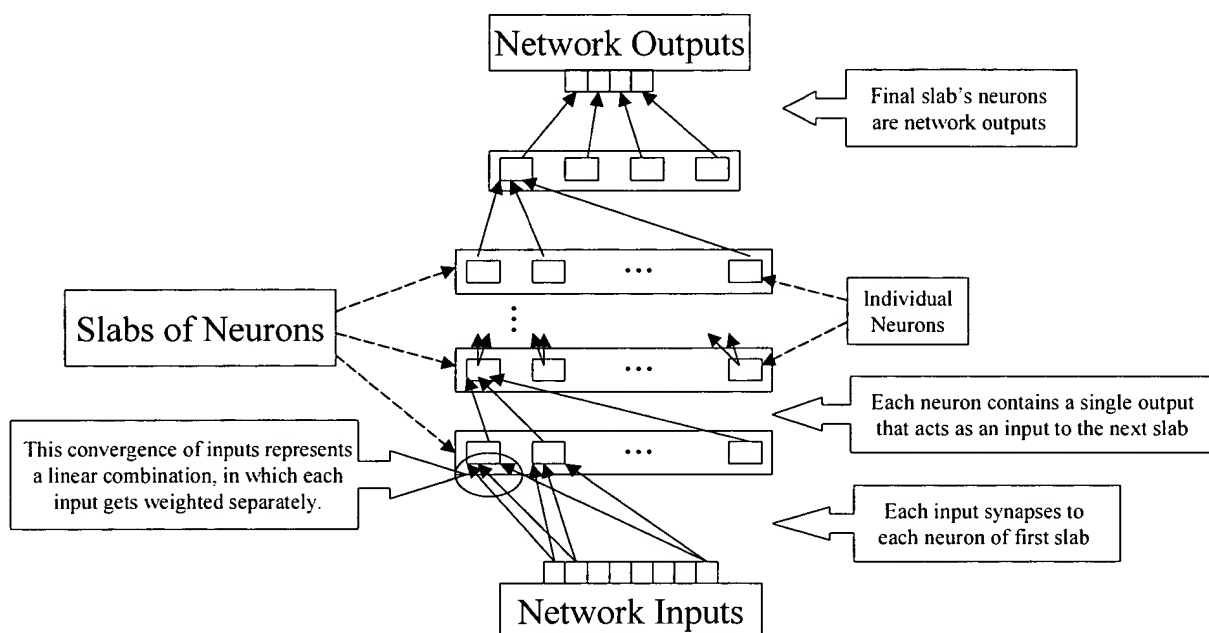
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Figure 1C
Structure of Neural Network
Training Routine



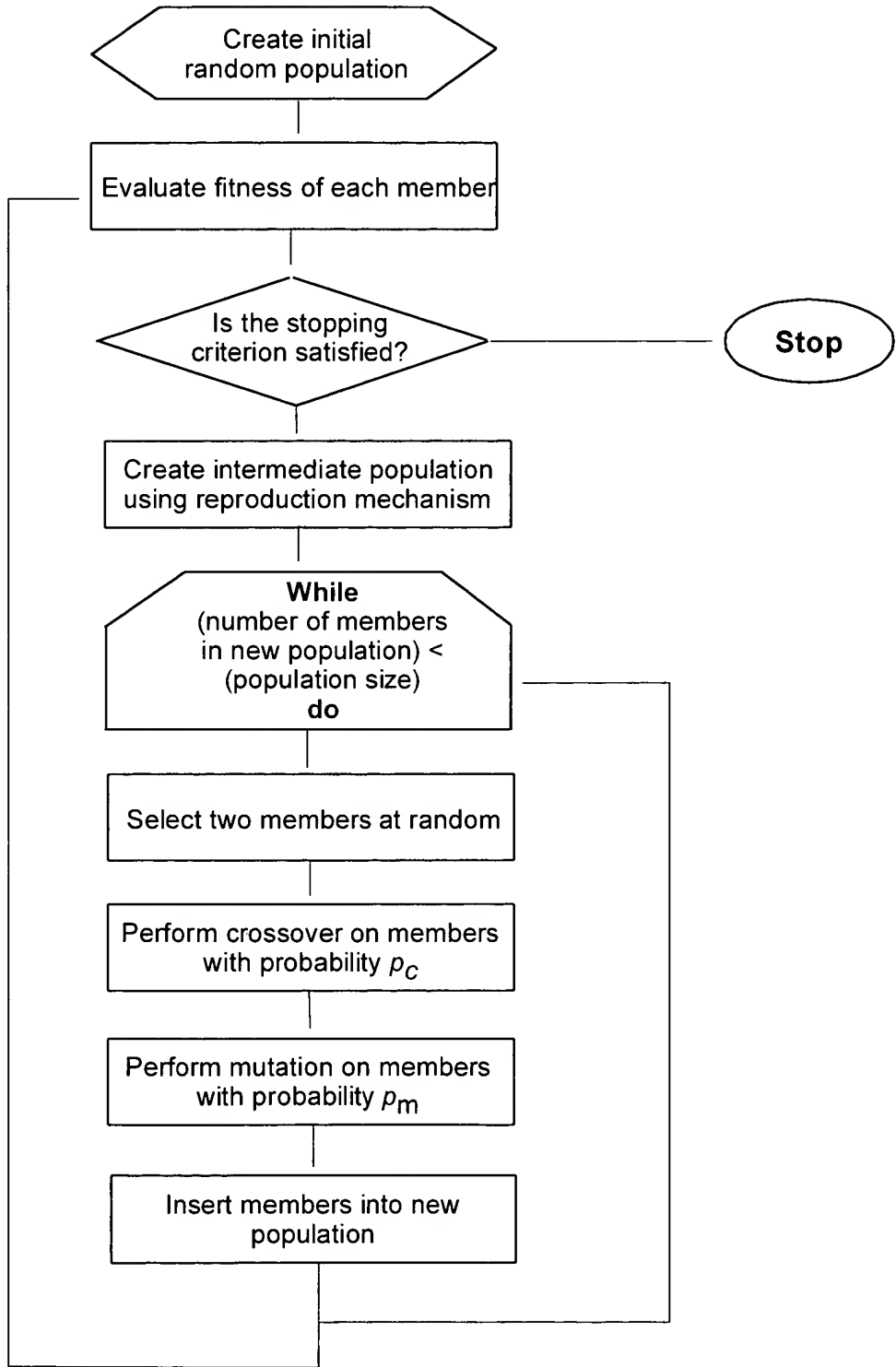
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Figure 1D:
Typical Mapping Neural Network



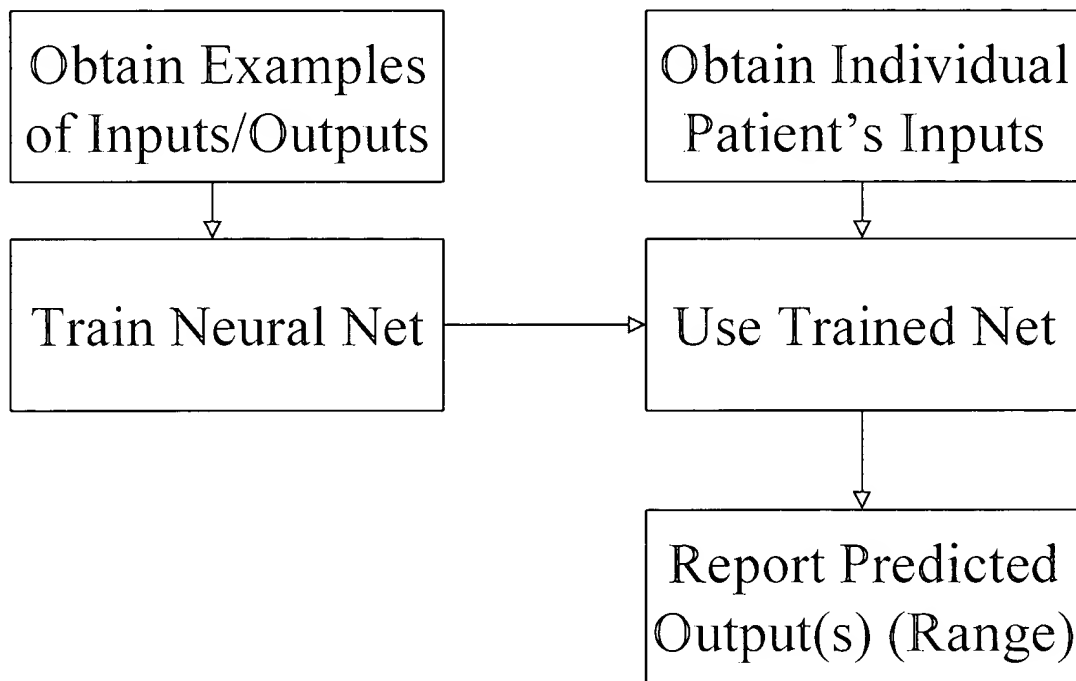
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Figure 1E: Typical Genetic Algorithm



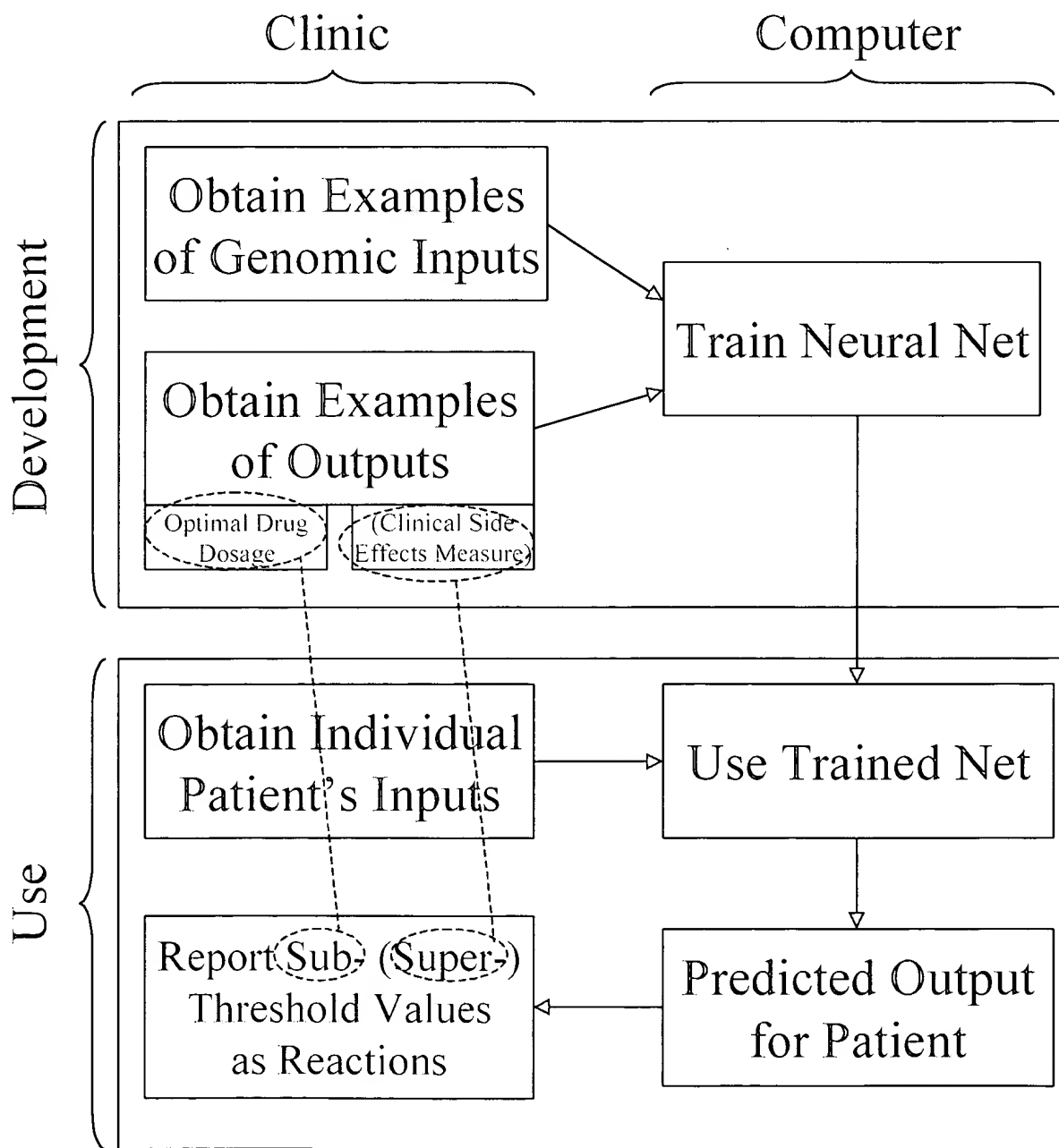
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Figure 2
Method of Predicting Clinical Variables
Given Genomic Data



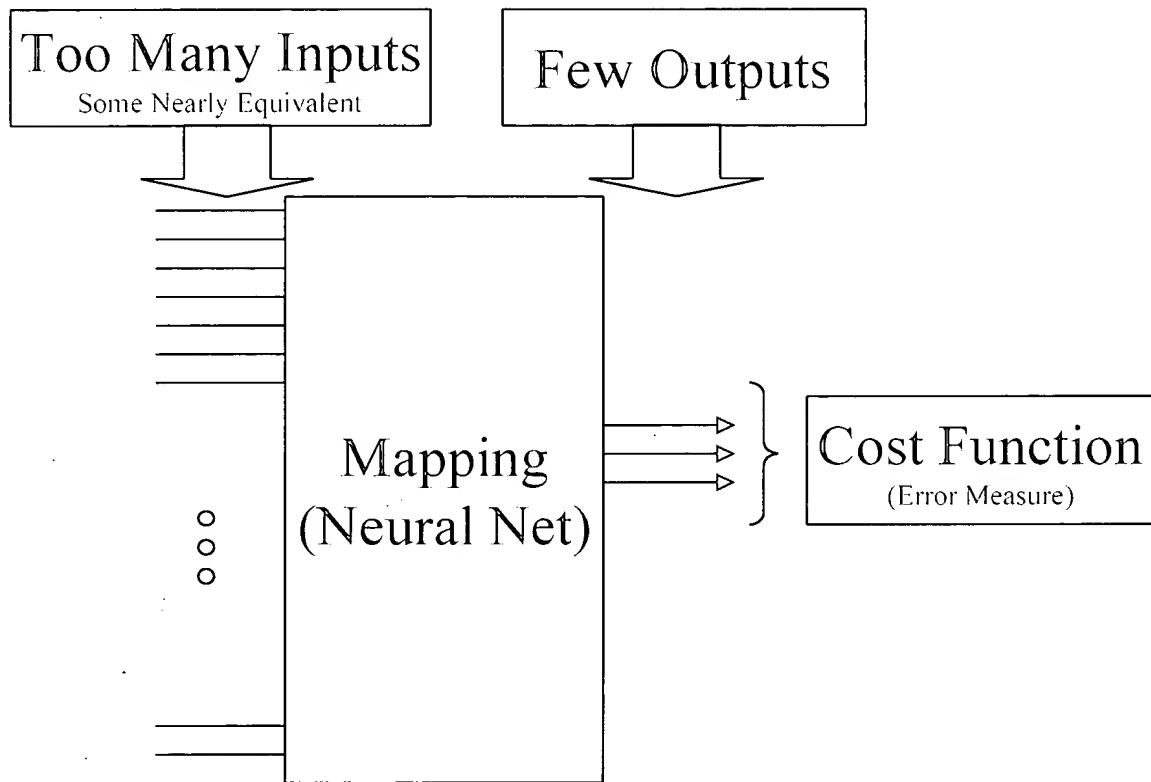
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Figure 3
Genomic Methods of Screening Patients for
Clinical Drug Use



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Figure 4A
GA Rolling: Illustration of Infeasible Initial
Mapping Problem



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Figure 4B
GA Rolling: Illustration of Individual
Category and its Genes

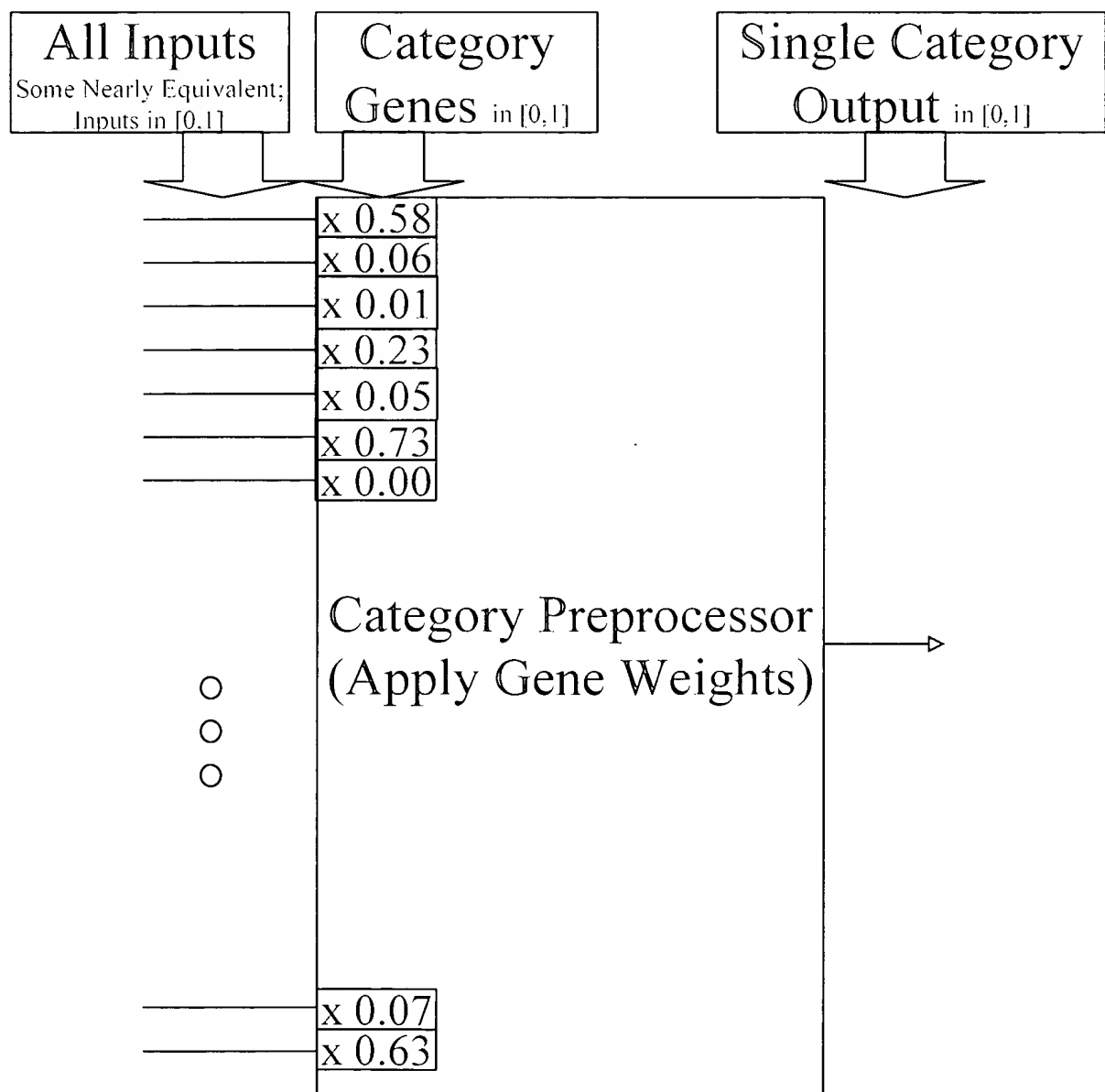


Figure 4C
GA Rolling: Illustration of the Mapping
Used by the Genetic Algorithm

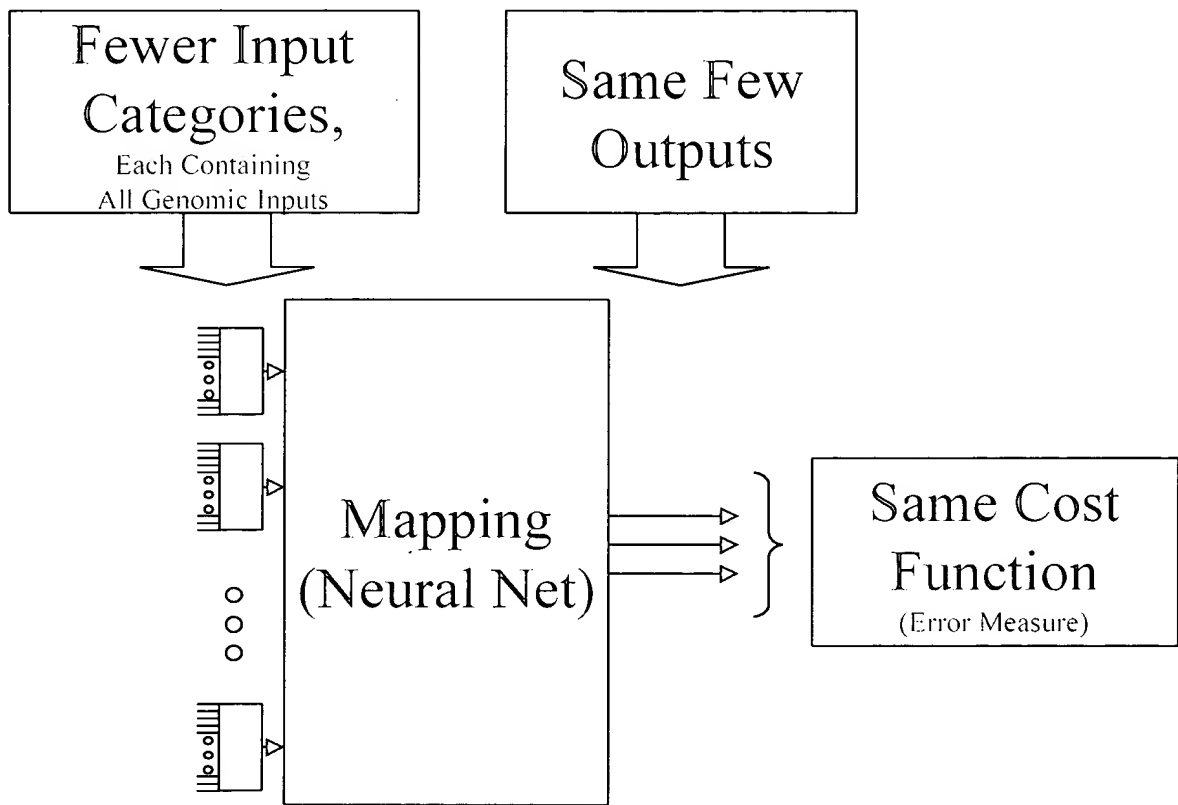
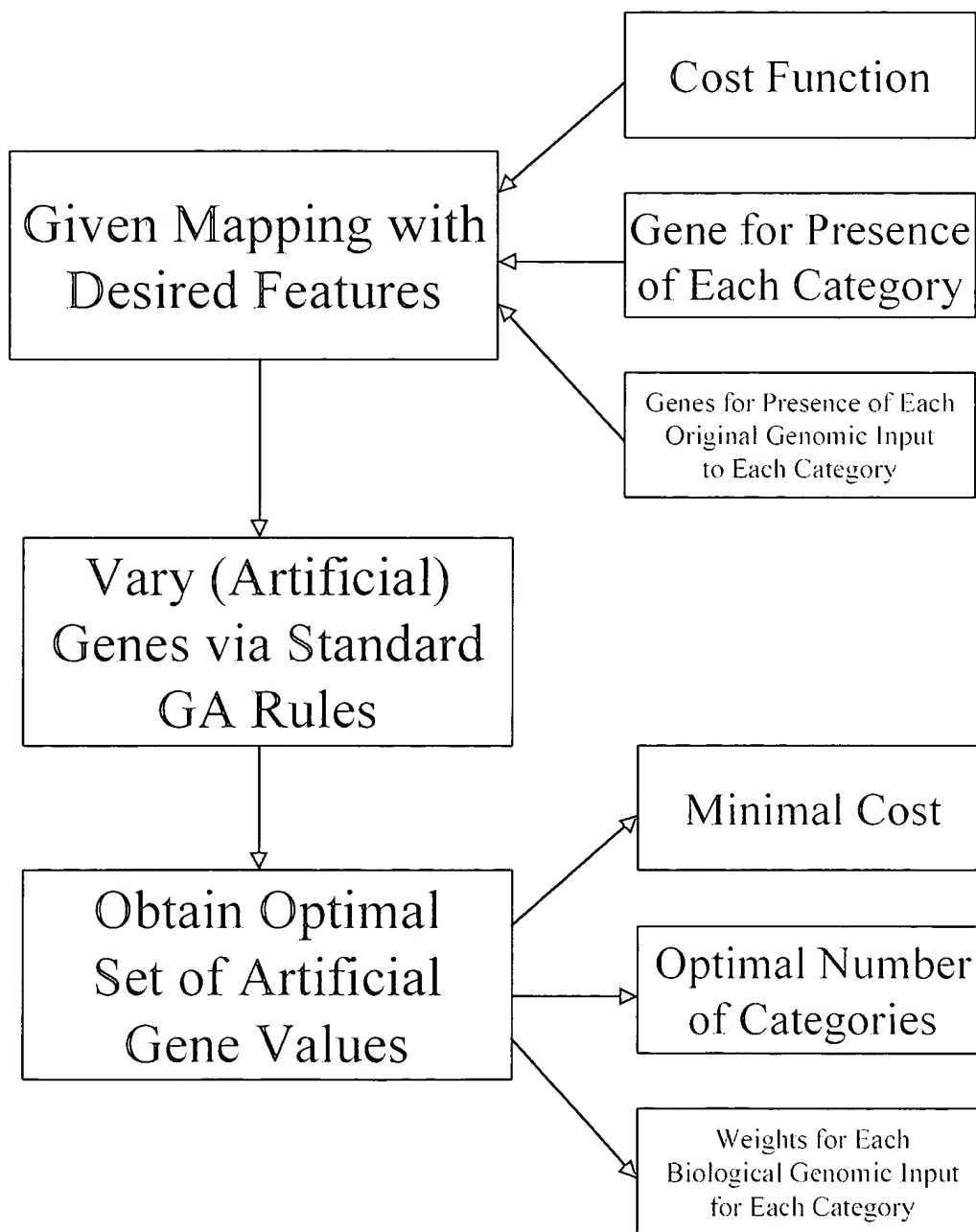


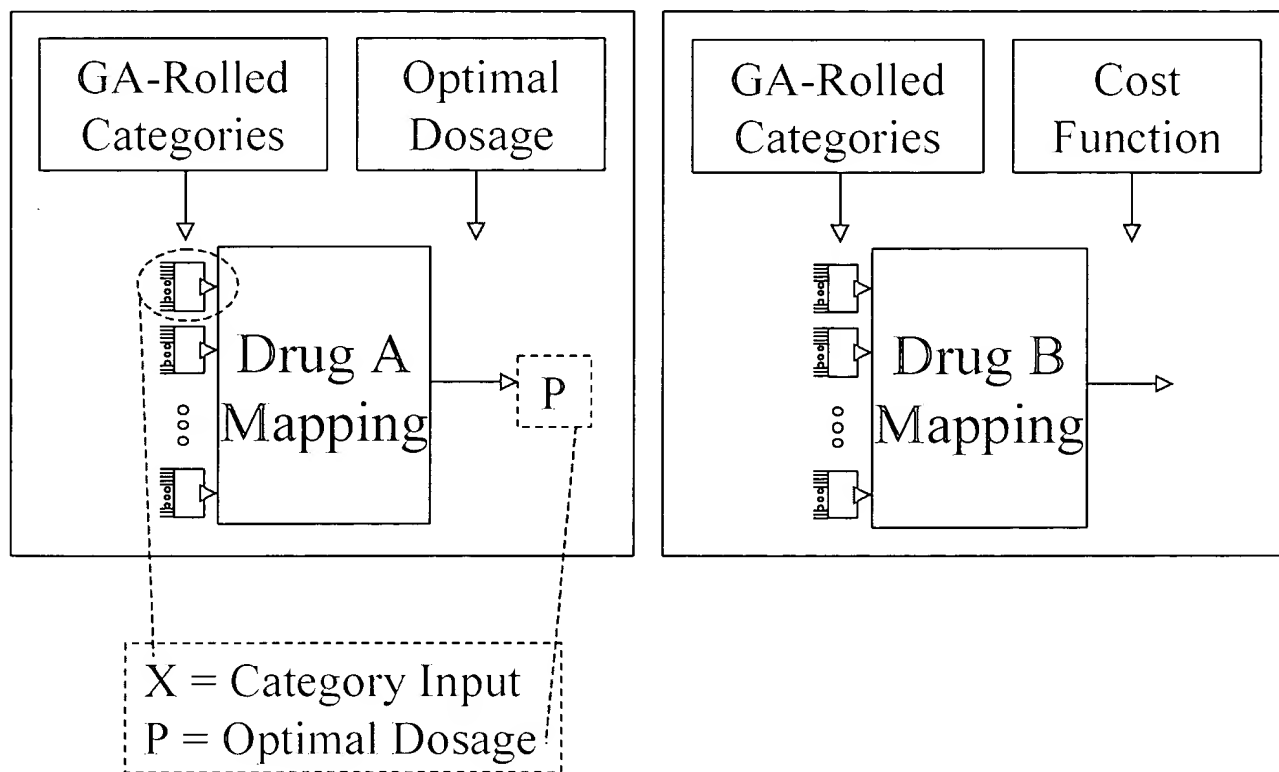
Figure 4D
GA Rolling: Illustration of the Use of the
Genetic Algorithm



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Figure 5A
Use of Functional Genomic Categorizations for
Predicting Drug Interactions:
Preliminary Constructs



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Figure 5B

Use of Functional Genomic Categorizations for Predicting Drug Interactions: Intermediate Calculations

“Equivalence” of optimal drug dosage
and category X:

$$E = -\delta(\ln(P)) / \delta(\ln(X))$$

(Roughly in range [-2,2].)



Estimated equivalent of optimal drug dosage
in units of category X:

$$\delta X_{\text{drug}} \sim E X_{\text{patient}}$$

$$(\delta X_{\text{drug}} = \text{Integral}(0, X_{\text{patient}}) E(X') dX')$$



Model effect of Drug A on Drug B
with effectively altered genomic inputs
(to Cost B mapping):

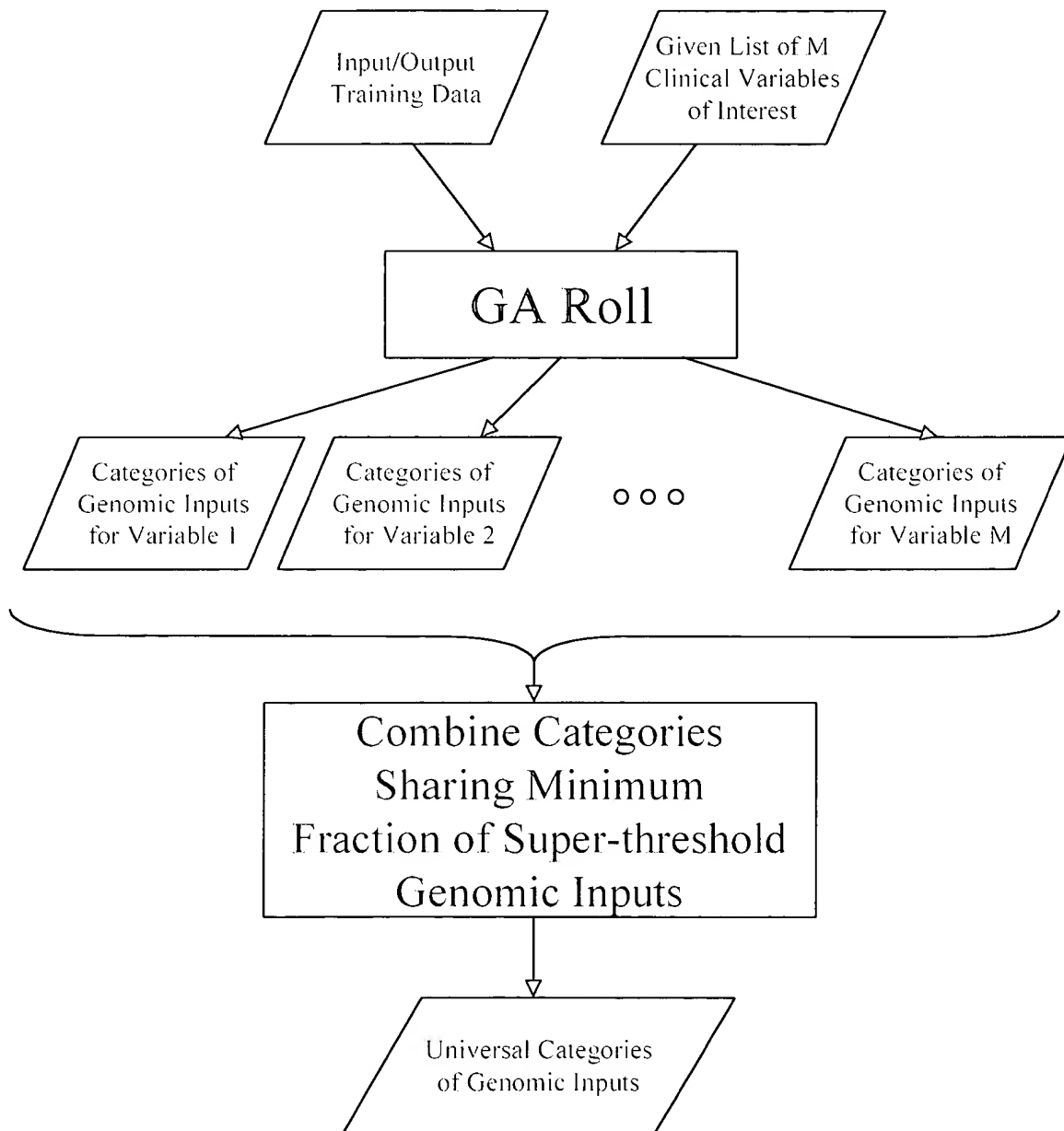
$$X = X_{\text{patient}} + \delta X_{\text{drug}}$$



Identify corresponding increases in Cost B
as interactions (of A on B) if cost
increases > e.g. 30%

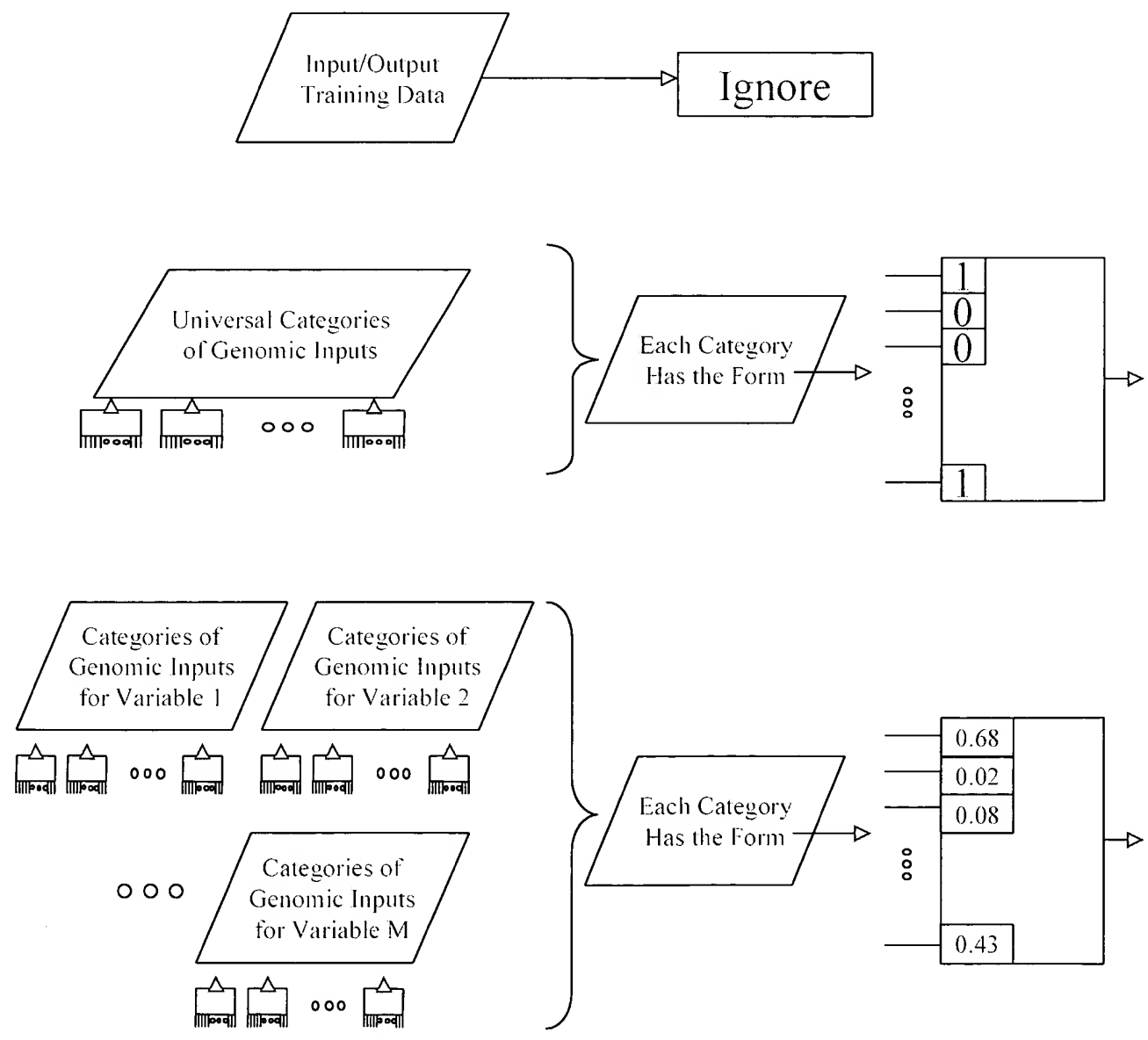
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Figure 6A
Universal Functional Genomic Categorization:
Assembly of Categories



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Figure 6B
 Universal Functional Genomic Categorization:
 Calculation of Probabilities:
 Given Information



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Figure 6C
 Universal Functional Genomic Categorization:
 Calculation of Probabilities:
 Identification of Data

